SIEMENS

PATENT
Attorney Docket No. 2003P08417WOUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Inventor:	J. Reinschke	)	Group Art Unit:	3725
Serial No.:	10/574,723	)	Examiner:	S. M. Jennings
Filed:	April 6, 2006	)	Confirmation No.:	1912
Title	**METHOD AND CONTROL DEVICE FOR OPERATING A MILL TRAIN FOR METAL STRIP**			

Mail Stop Appeal Brief - Patent
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APPELLANTS' BRIEF UNDER 37 CFR 41.37

Sir:

This brief is in furtherance of the Notice of Appeal filed in this application on 15 March 2010.

(Please proceed to the following page.)

1. REAL PARTY IN INTEREST - 37 CFR 41.37(c)(1)(i)

The real party in interest in this Appeal is the assignee of the present application, Siemens Aktiengesellschaft.

2. RELATED APPEALS AND INTERFERENCES - 37 CFR 41.37(c)(1)(ii)

There is no other appeal, interference or judicial proceeding that is related to or that will directly affect, or that will be directly affected by, or that will have a bearing on the Board's decision in this Appeal.

3. STATUS OF CLAIMS - 37 CFR 41.37(c)(1)(iii)

Claims canceled: 1 – 14 and 30 - 33.
Claims withdrawn but not canceled: None.
Claims pending: 15 - 29.
Claims allowed: none.
Claims rejected: 15 - 29.

The claims on appeal are 15 - 29. A copy of the claims on appeal is attached hereto in the Claims Appendix. Appellants respectfully appeal the final rejection of claims 15 - 29.

4. STATUS OF AMENDMENTS - 37 CFR 41.37(c)(1)(iv)

A response under 37 CFR 1.116 with no amendment to the claims was filed on 11 February 2010. The final rejections were maintained per the Advisory Action dated 03 March 2010.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER- 37 CFR 41.37(c)(1)(v)

CONCISE EXPLANATION OF SUBJECT MATTER DEFINED IN INDEPENDENT CLAIM 15.

With reference by page and line number to the detailed description, and with reference to the figures, the following summary describes one or more exemplary embodiments disclosed in the Specification and which are covered by one or more specific claims, but it is to be understood that the claims are not so limited in scope.

With reference to Figures 1 - 4, generally, **independent claim 15**, the sole independent claim, is directed to a method for operating a metal strip mill train such as shown in FIG. 1. See page 1, lines 12 - 13. Before summarizing terms of the claim, a brief background is provided to facilitate providing an understanding of the invention.

The term intrinsic strip flatness ip refers to the strip length distribution over tracks S1 to Sn, while the term visible flatness vp refers to a measured flatness which results from buldge behavior of a individual strip. Visible flatness vp may be a function of strip thickness, strip width, elasticity of the strip and tension to which the strip is subjected. With reference to Figure 4, visible flatness vp may be measured at a discharge point x2, and intrinsic flatness ip may be calculated at a point x1 between or after roll stands 3 of a finishing train. See page 6, lines 11 - 16. As explained at page 7, lines 16 - 31, the flatness values (ip and vp) are preferably determined in the following sequence:

(1) The visible flatness vp, which generally corresponds to the bulge behavior of the metal strip 1, is measured after a last roll stand 3, for example at the discharge point of a finishing train.

(2) The bulge model 12 (also referred to as the "strip model") is used to determine the intrinsic flatness ip of the metal strip 1 at the point for measuring the visible flatness vp.

(3) The <u>material flow model</u> 9 is used to determine the intrinsic flatness ip between the roll stands 3, for example within the finishing train. The intrinsic flatness can therefore be determined before the physical point for measuring flatness.

According to claim 15, a desired flatness of the strip is determined via a material flow model. As explained at page 8, lines 1 - 13, the relationship between an intrinsic flatness ip, between the roll stands 3, and an intrinsic flatness ip after the last of the roll stands 3 is established using the material flow model 9. Input variables such as the strip thickness contours of the metal strip 1 as well as flatness patterns or flatness values before and after passage through a roll stand 3 can be supplied to the material flow model 9. The material flow model 9 determines the intrinsic flatness pattern of the metal strip 1 online after passage through the roll stand 3 as well as a roll force pattern in the transverse direction y of the metal strip 1 and supplies it to a roll deformation model. The roll deformation model is preferably part of a regulating unit 11. The roll deformation model determines roll deformations and supplies them to a target value determination unit, which uses the determined roll deformations and a contour pattern of the metal strip 1 on the stand discharge side to determine the target values for the profile and flatness control elements in each individual roll stand 3.

Further in accord with claim 15, an actual flatness (e.g., vp) of the metal strip is measured near a discharge point of the mill train. See page 6, lines 18ff which state, with reference to Figure 4, that vp is measured at one point x2 at the discharge point of the mill train and is supplied to a bulge model 12 (strip model). With a topometric measurement of the visible flatness vp the surface structure of the metal strip 1 is captured at the surface and three-dimensionally over large areas of the metal strip 1.

Also per Claim 15, the measured metal strip flatness is translated into flatness values. See page 2, lines 7 - 16 which explain that by taking into account both the visible flatness vp of the mill train and the intrinsic flatness ip with the aid of the bulge model (strip model) means that extremely stringent requirements can be complied with in respect of the quality of the visible flatness of the metal strip. By translating values for the visible flatness into values for the intrinsic flatness or values for the intrinsic flatness into values for the visible flatness, intrinsic strip flatness values calculated using the material flow model and visible strip flatness values measured at the discharge point of a mill train can be brought into line with each other or verified.

Thus, also according to the method of claim 15, a roll stand of the mill train is controlled via a strip shape model providing a relationship between intrinsic flatness ip and visible flatness

vp and that uses the desired and actual flatness values as inputs to reduce the difference between the actual flatness and the desired flatness of the metal strip. In this regard, see page 8, lines 1 - 23. Recalling that the material flow model 9 determines the intrinsic flatness pattern of the metal strip 1 after passage through the roll stand 3 and supplies it to a roll deformation model, the roll deformation model determines roll deformations and supplies them to a target value determination unit, which uses the determined roll deformations and a contour pattern of the metal strip 1 to determine the target values for the profile and <u>flatness control elements in each individual roll stand 3</u>. Use of the bulge model 12 (strip model) allows the material flow model 9 and the profile and flatness control implemented in the module 10 (see FIG. 1 in each instance) to be adjusted based on the measured data for visible flatness vp. Upper and lower limits can be specified for the visible flatness vp or for the corresponding visible lack of flatness of the strip and these limits can be translated with the aid of the bulge model 12 into limits for the intrinsic flatness ip or intrinsic lack of flatness. The bulge model 12 (strip model) uses the intrinsic lack of flatness to calculate the bulge pattern of the metal strip 1. The calculated bulge pattern can be used in turn to determine the visible lack of flatness. Inverse modeling is used for the converse conclusion.

6. GROUNDS OF REJECTION TO BE REVIEWED UPON APPEAL - 37 CFR 41.37(c)(1)(vi)

1. Whether claims 15 - 18 are unpatentable under 35 U.S.C. Section 103 over Ginzburg (U.S. 4,771,622) in view of Gramckow (U.S. 6,697,699).

2. Whether claim 19 is unpatentable under 35 U.S.C. Section 103 over Ginzburg (U.S. 4,771,622) in view of Gramckow (U.S. 6,697,699) and further in view of Flormann (U.S. 6,480,802).

3. Whether claims 20 - 25 are unpatentable under 35 U.S.C. Section 103 over Ginzburg (U.S. 4,771,622) in view of Gramckow (U.S. 6,697,699) and further in view of Flormann (U.S. 6,480,802) and further in view of Pirlet (U.S. 4,541,723).

4. Whether claims 26 - 29 are unpatentable under 35 U.S.C. Section 103 over Ginzburg (U.S. 4,771,622) in view of Gramckow (U.S. 6,697,699) and further in view of Flormann (U.S. 6,480,802) and further in view of Pirlet (U.S. 4,541,723) and in still further view of Zhang (U.S. 5,927,117) and Schmid (U.S. 5,855,131).

7. ARGUMENT 37 CFR 41.37(c)(1)(vii)

APPELLANTS TRAVERSE ALL REJECTIONS BASED IN WHOLE OR PART ON THE GINZBURG REFERENCE (U.S. 4,771,622) IN VIEW OF THE GRAMCKOW REFERENCE (U.S. 6,697,699).

Patentability of Each Claim is to be Separately Considered

Appellants urge that, to the extent the claims are separately argued, patentability of each claim should be separately considered. General argument, based on deficiencies in the rejection of independent claim 15 demonstrates patentability of all dependent claims. However, none of the rejected claims stand or fall together because each dependent claim further defines a unique combination that patentably distinguishes over the art of record. For this reason, the Board is requested to consider all argument presented with regard to each dependent claim. To the extent provided, argument demonstrating patentability of each dependent claim is presented under subheadings identifying each claim by number.

General Basis To Overturn All Rejections Under Section 103

In order to sustain the rejection of independent claim 15, MPEP §2143 provides that three criteria must be met to establish a prima facie case of obviousness.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one skilled in the art, to modify the reference or to combine teachings of the references. Second, there must be a reasonable expectation of success.

Third, the prior art must teach or suggest **all** of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be both found in the prior art and not in the applicant's disclosure.

It is fundamental that all of the claimed features be found in the prior art combination in order to make a rejection. Yet this appeal is made because the prior art combinations used to reject the claims fail to provide all of the features and functions recited in each claim.

7A. APPELLANTS TRAVERSE THE REJECTIONS OF CLAIMS 15 - 18 BASED ON GINZBURG IN VIEW OF GRAMCKOW.

7A(1). REJECTION OF INDEPENDENT CLAIM 15 UNDER SECTION 103 BASED ON THE GINZBURG REFERENCE IN VIEW OF THE GRAMCKOW REFERENCE IS IN ERROR.

Appellants submit that the art rejections do not and cannot identify every feature of independent claim 15 and the claims which depend therefrom. The following discussion illustrates how the rejection fails to identify all of the claimed features.

Several features of claim 15 cannot be found in the combination of the Ginzburg reference in view of the Gramckow reference. The following remarks are directed to deficiencies in the rejection of claim 15.

Claim 15 requires, among other features,

> determining a desired flatness of the strip via a material flow model;
> measuring an actual flatness of the metal strip near a discharge point of the mill train;
> translating the measured metal strip flatness into flatness values;
> controlling a roll stand of the mill train via a strip shape model providing a relationship between intrinsic flatness ip and visible flatness vp and that uses the desired and actual flatness values as inputs to reduce the difference between the actual flatness and the desired flatness of the metal strip.

The rejection contends that the first feature, that of *"determining a desired flatness of the strip via a material flow model ..."* is met by a disclosure at col. 5, lines 8 - 13 of Ginzburg, but that passage does not disclose this subject matter. The citation does refer to generating adaptive

constants for a strip shape model, but say nothing with regard to using a material flow model to determine "a desired flatness of the strip."

Claim 15 also requires

controlling a roll stand of the mill train via a strip shape model providing a relationship between intrinsic flatness ip and visible flatness vp and that uses the desired and actual flatness values as inputs to reduce the difference between the actual flatness and the desired flatness of the metal strip.

The rejection attempts to read this feature on the passages in Gramckow at col. 2, line 59 - col. 3, line 11, but the Gramckow reference does not provide a strip shape model providing a relationship between intrinsic flatness ip and visible flatness vp. As noted at page 3 of the earlier non-final office action mailed 5/19/09: col. 2, line 59 - col. 3, line 11 of the Gramckow reference are relied upon for using desired and actual flatness values as inputs to reduce the difference between the actual flatness and the desired flatness of a metal strip, but this is not the same as using a model that provides a relationship between intrinsic flatness and visible flatness.

Applicant respectfully submits that the term "strip shape model" is defined in the specification at pages 9 - 11 (i.e., see paragraphs 00041 - 00051). The prior art citation (Gramckow, col. 2, line 59 - col. 3, line 11) does not disclose or use a strip shape model.

The rejection based on Ginzburg in view of Gramckow was presented for the first time in the final office action which resulted in this appeal (although the Gramckow reference was applied in a similar manner in the prior non-final rejection). In response to Appellant's traversal filed 11 February '10, the advisory action mailed 3 March '10 provides the following very brief comment which is not specific to any one of the above-noted deficiencies:

The visible flatness can be read as the waviness of the strip during processing and the intrinsic flatness can be read as the actual flatness at the discharge point. Furthermore, the arguments presented are not persuasive as it would be obvious to one skilled in the art to take a set of data points and design a model for testing.

Appellants cannot find any relevance between the above-quoted remarks and the merits of the rejections or the above-noted deficiencies. The rejection has glossed over the language of the claim which cannot be rendered consistent with the prior art combination and makes no effort to compensate for such.

For all of these reasons the rejection of claim 15 is in error and must be reversed.

7B. THE REJECTIONS UNDER SECTION 103 OF CLAIMS 16 - 18 WHICH EACH DEPEND FROM CLAIM 15, ALSO BASED ON THE GINZBURG REFERENCE IN VIEW OF THE GRAMCKOW REFERENCE ARE ALSO IN ERROR.

7B(1) CLAIM 16 IS ALLOWABLE UNDER SECTION 103.

Claim 16 rises or falls with the claim from which it depends.

7B(2) CLAIM 17 IS ALLOWABLE UNDER SECTION 103.

Claim 17 rises or falls with the claim from which it depends.

7B(3) CLAIM 18 IS ALLOWABLE UNDER SECTION 103.

According to claim 18, the actual flatness is determined as a three-dimensional strip shape pattern. The rejection cites Ginzburg at col. 5, lines 8 - 13 and col. 6, lines 55 - 60, but none of this refers to determining flatness as a three-dimensional strip shape pattern. Mere reference to a waviness signal or a flatness does not meet the terms of this claim.

7C. THE REJECTION UNDER SECTION 103 OF CLAIM 19 WHICH DEPENDS FROM CLAIM 15, BASED ON THE GINZBURG REFERENCE IN VIEW OF THE GRAMCKOW REFERENCE ANDIN FURTHERVIEW OF FLORMAN IS ALSO IN ERROR.

Claim 19 requires, for the three-dimensional strip shape pattern of claim 18 that a relative length of individual tracks of the metal strip is evaluated to determine the strip shape pattern along with a variable of the individual tracks selected from the group consisting of: wavelength, amplitude and phase offset. The Flormann reference is cited for disclosing this subject matter,

but there is no disclosure therein of a "phase offset" and it is not suggested from the citation that there is a three-dimensional strip pattern.

7D. THE REJECTIONS UNDER SECTION 103 OF CLAIMS 20 - 25 WHICH EACH DEPEND FROM CLAIM 15, BASED ON THE GINZBURG REFERENCE IN VIEW OF THE GRAMCKOW REFERENCE AND FURTHER IN VIEW OF FLORMANN AND FURTHER IN VIEW OF PIRLET ARE ALSO IN ERROR.

7D(1) CLAIMS 20 - 22 ARE ALLOWABLE UNDER SECTION 103.

Claims 20 - 22 each rise or fall with the claim from which it depends.

7D(2) CLAIM 23 IS ALLOWABLE UNDER SECTION 103.

Claim 23 requires that the values for the desired flatness are translated into values for the actual flatness using the strip shape model. The feature cannot be found because the prior art does not disclose a model which translates values of desired flatness into values for the actual flatness using the strip shape model.

7D(3) CLAIM 24 IS ALLOWABLE UNDER SECTION 103.

Claim 24 requires that the flatness values are translated in real-time. Despite citation to Ginzburg, it is not seen how this feature can be present in the prior art when there is no strip shape model which translates values of desired flatness into values for the actual flatness.

7D(4) CLAIM 25 IS ALLOWABLE UNDER SECTION 103.

Claim 25 rises or falls with the claim from which it depends.

7E. THE REJECTIONS UNDER SECTION 103 OF CLAIMS 26 - 29 ARE ALSO IN ERROR.

Claims 26 - 29 each rise or fall with the claim from which it depends.

7F. CONCLUSIONS

Argument has been presented to demonstrate that the rejections under Section 103 are deficient and that numerous ones of the dependent claims further distinguish over the prior art. The Examiner has argued rejections when claimed features are not obtainable from the prior art and when other features must be taken out of context and reconstructed from the prior art without motivation for doing such. Because features of the claims are absent it was necessary to disregard features of the independent claims and/or reconstruct the prior art with neither a teaching nor a motivation to do so. Obviousness has been argued when features of claim 15 are absent from the prior art and the references must therefore be assembled in hindsight recognition of Appellants' teachings. For the detailed reasons presented, there cannot be a prima facie case of obviousness and none of the rejections can be sustained. All of the rejections should be overturned and all of the claims should be allowed.

8. APPENDICES

An appendix containing a copy of the claims involved in this appeal is provided herewith. No evidence appendix or related proceedings appendix is provided because no such evidence or related proceeding is applicable to this appeal.

Respectfully submitted,

Dated: May 14, 2010

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9. APPENDIX OF CLAIMS ON APPEAL

15. A method for operating a metal strip mill train, comprising:

determining a desired flatness of the strip via a material flow model;

measuring an actual flatness of the metal strip near a discharge point of the mill train;

translating the measured metal strip flatness into flatness values;

controlling a roll stand of the mill train via a strip shape model providing a relationship between intrinsic flatness ip and visible flatness vp and that uses the desired and actual flatness values as inputs to reduce the difference between the actual flatness and the desired flatness of the metal strip.

16. The method as claimed in claim 15, wherein the actual flatness of the metal strip is measured at the discharge point of the mill train.

17. The method as claimed in claim 15, wherein the actual flatness is determined as a strip shape pattern.

18. The method as claimed in claim 17, wherein the strip shape pattern is three-dimensional.

19. The method as claimed in claim 18, wherein a relative length of individual tracks of the metal strip is evaluated to determine the strip shape pattern along with a variable of the individual tracks selected from the group consisting of: wavelength, amplitude and phase offset.

20. The method as claimed in claim 19, wherein a laser measuring device is used to determine the desired flatness of the metal strip.

21. The method as claimed in claim 20, wherein the laser measuring device is a multi-track laser measuring device.

22. The method as claimed in claim 20, wherein the actual flatness of the metal strip is measured topographically.

23. The method as claimed in claim 22, wherein the values for the desired flatness are translated into values for the actual flatness using the strip shape model.

24. The method as claimed in claim 23, wherein the flatness values are translated in real-time.

25. The method as claimed in claim 24, wherein, the flatness values are translated in real-time via an approximation function.

26. The method as claimed in claim 25, wherein the metal strip shape pattern based on the strip flatness is determined via the strip shape model by applying an assumed temperature distribution in the transverse direction of the metal strip.

27. The method as claimed in claim 26, wherein the actual flatness of the metal strip is measured by a laser measuring device.

28. The method as claimed in claim 27, wherein the laser measuring device is a multi-track laser measuring device.

29. The method as claimed in claim 27, wherein a flatness limit value is predefined at points to control the mill train.

10. EVIDENCE APPENDIX - 37 CFR 41.37(c) (1) (ix)

None

11. RELATED PROCEEDINGS APPENDIX - 37 CFR 41.37(c) (1) (x)

None